ABSTRACT OF THE DISCLOSURE

A catalyst is provided for addition polymerization of olefinically unsaturated monomers comprisinga first compoundMY, wherein M is a transition metal in a low valency state or a transition metal in a low valency state coordinated to at least one coordinating non-charged ligand,Y is a monovalent, divalent or polyvalent counterion;an initiator compound comprising a homolytically breakable bond with a halogen atom; andan organodiimine, where at least one of the nitrogens of the diimine is not part of an aromatic ring. A catalyst for addition polymerization of olefinically unsaturated monomers is also provided comprisinga first component of Formula

$[ML]^{n+}A^{n-}$,wherein M = a transition metal of low valency state, L = an organodiimine where at least one of the nitrogens of the diimine is not part of an aromatic ring, A = an anion, n = an integer of 1 to 3, m = an integer of 1 or 2;

e) An initiator compound comprising a homolytically breakable bond with a halogen atom.

Preferably, the organodiimine is a 1,4-diaza-1,3-butadiene, a pyridine carbaldelyde imine, an oxazolidone or a quinoline carbaldehyde.

Processes for using the catalysts are also disclosed.